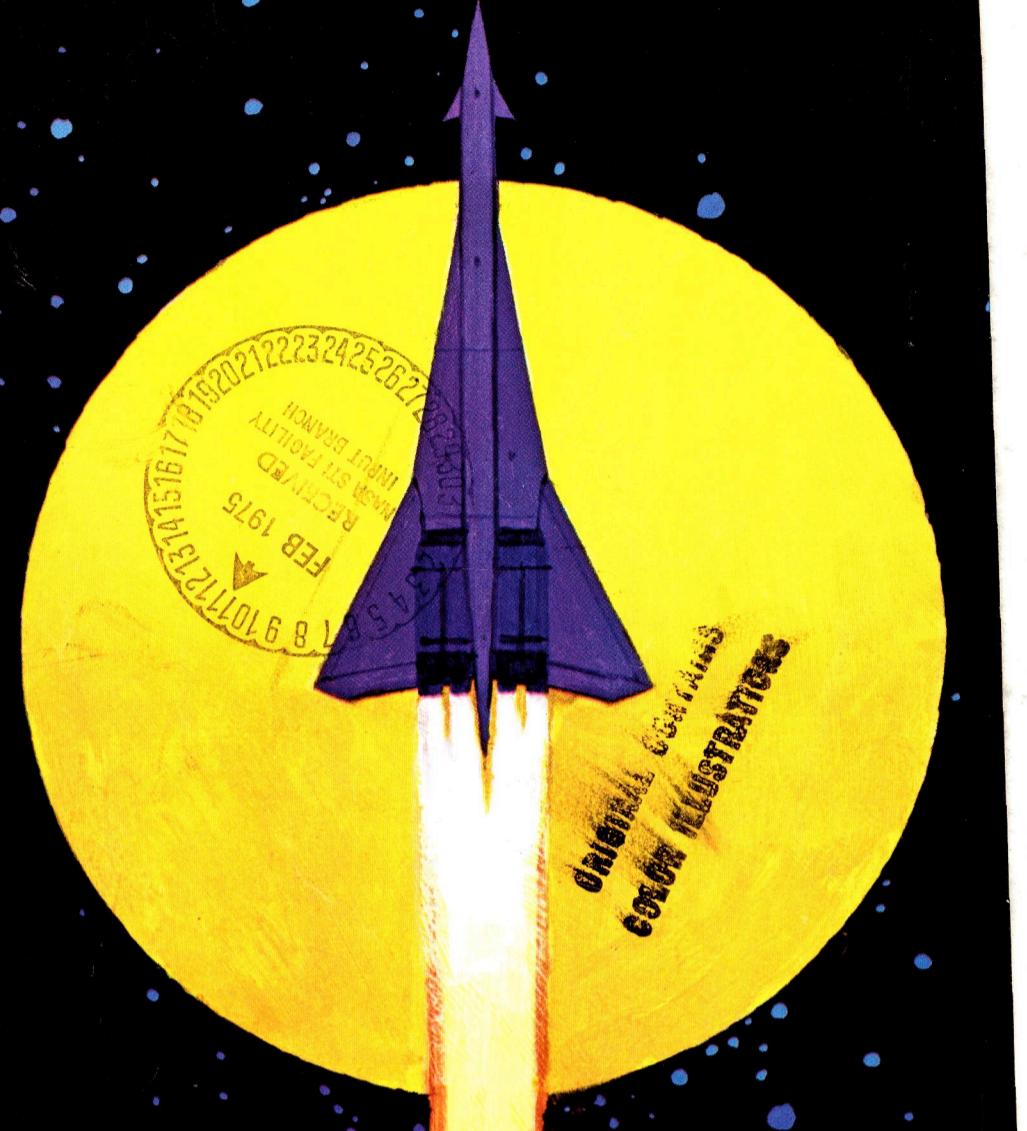


# NASA AERONAUTICS



(NF-465/5-74) NASA AERONAUTICS (NASA)

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The NASA Aeronautics Program is directed toward maintaining United States superiority in both civil and military aviation. Quieter, safer, and more efficient aircraft that provide improved service and performance are broad objectives.

Through basic research, wind tunnel and computer simulations, and experimental flight programs, the NASA aeronautical scientists, engineers, and test pilots are working closely with U.S. industry and other government agencies to achieve these objectives.

New designs, materials, and technology are pointing the way toward major reductions in aircraft noise, pollution, and airway and airport congestion. Other programs probe the high-speed end of the flight regime, developing means to fly faster, smoother, and more efficiently.

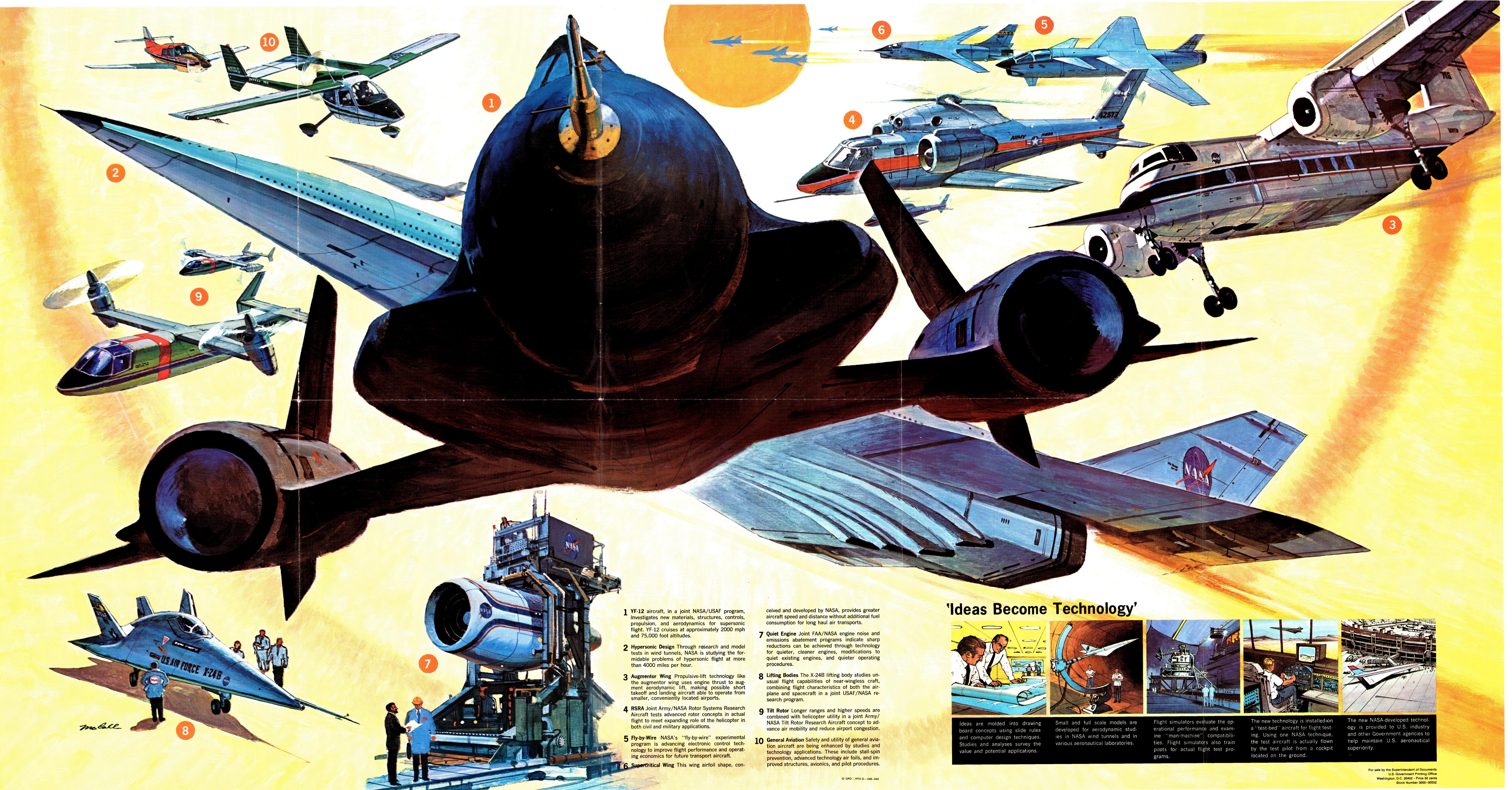
Research to further enhance flight

safety in both civil and general aviation includes solving the trailing vortex problem of aircraft-generated air currents, testing automatic takeoff and landing techniques, and improving aircraft handling qualities, to mention but a few.

Edging toward space, NASA is studying the unusual flight habits of lifting bodies, near-wingless aircraft that combine the characteristics of both aircraft and spacecraft.

Very high speed flight research, for the development of technology needed in the years ahead, provides the U.S. with new options in aeronautics.

This workload today is the foundation of aeronautical progress tomorrow. It builds a technology that supports the nation's leadership in the international aerospace market—a major contributor to a favorable U.S. balance of trade.



1. **YF-12 aircraft** In a joint NASA/USAF program, investigators new materials, structures, controls, propulsion, and aerodynamics for supersonic flight. YF-12 cruises at approximately 2000 mph and 75,000 foot altitudes.

2. **Hypersonic Design** Through research and model tests in wind tunnels, NASA is studying the formidable problems of hypersonic flight at more than 4000 miles per hour.

3. **Augmentor Wing** Propulsive-lift technology like the augmentor wing uses engine thrust to augment aerodynamic lift, making possible short takeoff and landing aircraft able to operate from smaller, conveniently located airports.

4. **RSR Joint Army/NASA Rotor Systems Research** Aircraft tests advanced rotor concepts in actual flight to meet expanding role of the helicopter in both civil and military applications.

5. **Fly-by-Wire** NASA's "fly-by-wire" experimental program is advancing electronic control technology to improve flight performance and operating economics for future transport aircraft.

6. **Supercritical Wing** This wing airfoil shape, con-

ceived and developed by NASA, provides greater aircraft speed and distance without additional fuel consumption for long haul air transports.

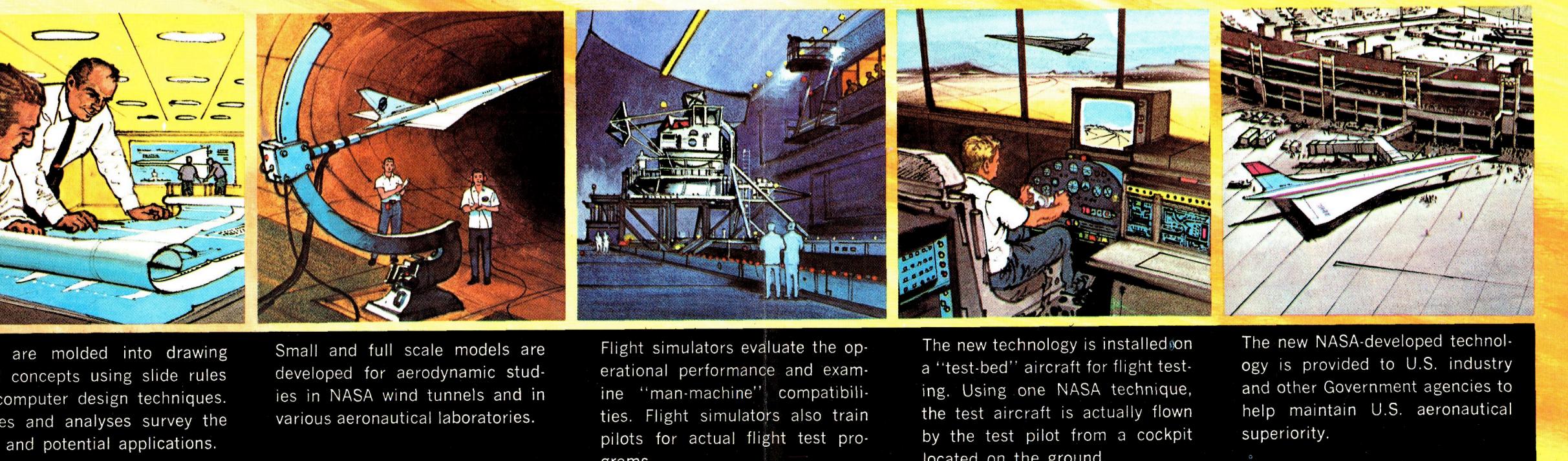
7. **Quiet Engine** FAA/NASA engine noise and emissions abatement programs indicate sharp reductions can be achieved through technology for quieter, cleaner engines, modifications to quiet existing engines, and quieter operating procedures.

8. **Lifting Bodies** The X-24 lifting body studies unusual flight capabilities of near-wingless craft, combining flight characteristics of both the airplane and spacecraft in a joint USAF/NASA research program.

9. **Tilt Rotor** Longer ranges and higher speeds are combined with helicopter utility in a joint Army/NASA Tilt Rotor Research Aircraft concept to advance air mobility and reduce airport congestion.

10. **General Aviation** Safety and utility of general aviation aircraft are being enhanced by studies and technology applications. These include stall-spin prevention, advanced technology air foils, and improved structures, avionics, and pilot procedures.

## 'Ideas Become Technology'



Ideas are molded into drawing board concepts using slide rules and computer design techniques. Studies and analyses survey the value and potential applications.

Small and full scale models are developed for aerodynamic studies in NASA wind tunnels and in various aeronautical laboratories. Flight simulators evaluate the operational performance and examine "man-machine" compatibility. Flight simulators also train pilots for actual flight test programs.

The new technology is installed on a "test-bed" aircraft for flight testing. Using one NASA technique, the test aircraft is actually flown by the test pilot from a cockpit located on the ground. The new NASA-developed technology is provided to U.S. industry and other Government agencies to help maintain U.S. aeronautical superiority.